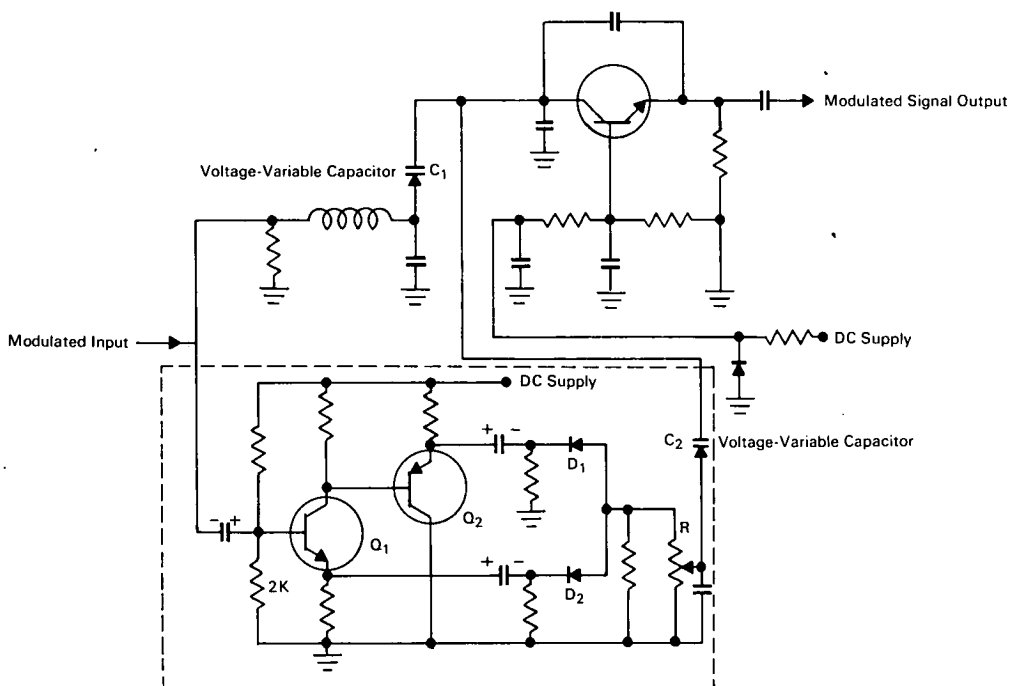


NASA TECH BRIEF



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Circuit Reduces Distortion of FM Modulator



The problem: To reduce second harmonic and intermodulation distortion of a voltage-variable capacitor used to modulate an oscillator.

The solution: A correction circuit designed to improve the linearity of the voltage-variable capacitor used to modulate a free-running oscillator.

How it's done: The circuit diagram shows the use of the voltage-variable capacitor C_1 , with the correction circuit enclosed in dashed lines. The modulating signal input is phase-inverted and amplified (by Q_1 – Q_2) and applied to the full-wave-rectifier diodes D_1

and D_2 to generate the second harmonic without introducing any of the fundamental frequency into the correction circuit. Operation takes place in the square-law portion of the rectifier-diode characteristic, so that D_1 and D_2 also perform a squaring function. The output from the rectifier-squaring network is applied to the potentiometer, R , which then provides a correction signal to the voltage-variable capacitor C_2 across the tuned circuit of the oscillator. The correction signal must have the proper polarity to reduce total tank-circuit capacitance on both the positive and the negative peak swings of the modulating signal input. A gain control at the rectifier output provides for adjustment of the correction-signal level.

(continued overleaf)

Notes:

1. Although this circuit was designed to improve the linearity of modulation of a free-running oscillator where modulation is accomplished by use of a voltage-variable capacitor, it may also be applied to either the master oscillator in a radio transmitter or a subcarrier oscillator in a telemetry system. However, this improvement is applicable only to audio frequency modulation and will not correct for slowly varying dc inputs in some telemetry systems.

2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland, 20771
Reference: B65-10152

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: Radio Corporation of America,
under contract to Goddard Space Flight Center
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